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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,875	10/12/2006	Bruce C.B. Chan	LDEI-102/PCT/US	5938
31217	7590	12/15/2009	EXAMINER	
Loctite Corporation			FEELY, MICHAEL J	
One Henkel Way				
Rocky Hill, CT 06067			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/599,875	Applicant(s) CHAN ET AL.
	Examiner Michael J. Feely	Art Unit 1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 31 August 2009.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-4,10-19,22,23,28,29,34 and 36-41 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-4,10-19,22,23,28,29,34 and 36-41 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20090831
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) Notice of Informal Patent Application
- 6) Other: _____

DETAILED ACTION

Pending Claims

Claims 1-4, 10-19, 22, 23, 28, 29, 34, and 36-41 are pending.

Response to Amendment

1. The rejection of claims 1-3, 10, 11, 22, 28, 29, 34, and 36 under 35 U.S.C. 103(a) as being unpatentable over Wong et al. (US Pat. No. 6,180,696) has been overcome by amendment.
2. The rejection of claims 1-4, 10, 11, 22, 23, 28, 29, 34, 36 under 35 U.S.C. 103(a) as being unpatentable over Shah (US 2004/0087681 A1) has been overcome by amendment.
3. The rejection of claims 12-19 under 35 U.S.C. 103(a) as being unpatentable over Wong et al. (US Pat. No. 6,180,696) or Shah (US 2004/0087681 A1) in view of Rubinsztajn et al. (US 2004/0101688 A1) has been overcome by amendment.
4. The rejection of claims 4 and 23 under 35 U.S.C. 103(a) as being unpatentable over Wong et al. (US Pat. No. 6,180,696) in view of Shah (US 2004/0087681 A1) has been overcome by amendment.
5. The objection to claim 23 has been overcome by amendment.

Priority

6. This instant application is a national stage entry of PCT/US05/12264, filed April 12, 2005, which claims priority to US provisional application No. 60/564,782, filed April 22, 2004. The provisional application supports the instantly claimed subject matter. Accordingly, the effective filing date of the instant invention is April 22, 2004.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. Claims 1-3, 10, 22, 28, 29, 34, and 36-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Chan et al. (US Pat. No. 6,882,058).

The applied reference has a common inventors with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the

inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1-3, 10, 22, 28, 29, and 37-39, Chan et al. disclose: (1 & 28) a method for improving flux compatibility of an under-fill composition in the presence of flux, flux residues and/or reaction products thereof (Abstract; column 2, lines 49 through column 4, line 3) and (29) a method for improving HAST performance of an under-fill formulation in the presence of flux, flux residues and/or reaction products thereof (Abstract; column 2, lines 49 through column 4, line 3), said methods comprising adding an effective amount of one or more cationic catalyst(s) to said under-fill formulation (column 4, lines 52-63, *particularly lines 62-63*), wherein said under-fill formulation is a non-fluxing under-fill formulation (Abstract; column 2, lines 49-59);

(2) wherein the under-fill formulation comprises one or more curable resins (column 4, lines 19-41) and the one or more cationic catalyst(s) (column 4, lines 52-63, *particularly lines 62-63*); (3) wherein the under-fill formulation further comprises filler (column 10, lines 40-51);

(10) wherein the under-fill formulation further comprises at least one curing agent (column 2, lines 49-59; column 7, line 65 through column 8, line 8; column 9, lines 24-31: *these materials are inherently capable of acting as a curing agent for epoxy resins*);

(22) wherein the curable resin is selected from the group consisting of epoxy resins, phenol resins, maleimide resins, itaconamide resins, nadimide resins, (meth)acrylate resins, polyamide resins, polyimide resins, cyanate ester resins, and combinations of any two or more thereof (column 3, lines 13-18); and

(37-39) wherein said under-fill formulation is a capillary flow under-fill formulation (column 1, lines 13-20; column 11, line 62 through column 12, line 34).

Regarding claims 34 and 40, Chan et al. disclose: (34) a method for adhesively attaching an electronic component to a circuit board in the presence of flux, flux residues and/or reaction products thereof (column 12, lines 38-56), the method comprising curing (column 12, lines 38-56) a composition comprising one or more curable resins (column 4, lines 19-41) and one or more cationic catalyst(s) (column 4, lines 52-63, *particularly lines 62-63*) after application of the composition between the component and the board (column 12, lines 38-56), wherein said composition is a non-fluxing under-fill composition (Abstract; column 2, lines 49-59); and (40) wherein said under-fill formulation is a capillary flow under-fill formulation (column 1, lines 13-20; column 11, line 62 through column 12, line 34).

Regarding claims 36 and 41, Chan et al. disclose: (36) an article comprising an electronic component adhesively attached to a circuit board in the presence of flux, flux residues and/or reaction products thereof (column 12, lines 63 through column 13, line 3), wherein the electronic component is adhesively attached to the board by a cured aliquot of a composition (column 12, lines 63 through column 13, line 3) comprising one or more curable resins (column 4, lines 19-41) and one or more cationic catalyst(s) (column 4, lines 52-63, *particularly lines 62-63*), wherein said composition is a non-fluxing under-fill composition (Abstract; column 2, lines 49-59); (41) wherein said under-fill formulation is a capillary flow under-fill formulation (column 1, lines 13-20; column 11, line 62 through column 12, line 34).

Claim Rejections - 35 USC § 102/103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-3, 10-19, 22, 28, 29, 38, and 39 are rejected under 35 U.S.C. 102(c) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Rubinsztajn et al. (US 2004/0101688).

Regarding claims 1-3, 10-19, 22, 28, 29, and 37-39, Rubinsztajn et al. disclose: *(1, 28, 29)* a method of formulating an under-fill formulation (Abstract; paragraph 0048), said method comprising adding an effective amount of one or more cationic catalyst(s) to said under-fill formulation (Abstract; paragraph 0032), wherein said under-fill formulation is a non-fluxing under-fill formulation (*composition appears to be free of fluxing material*);

(2) wherein the under-fill formulation comprises one or more curable resins (Abstract; paragraphs 0013-0024) and the one or more cationic catalyst(s) (Abstract; paragraphs 0032); *(3)* wherein the under-fill formulation further comprises filler (Abstract; paragraphs 0026-0031); *(10)* wherein the under-fill formulation further comprises at least one curing agent (paragraph 0033);

(11) wherein the cationic catalyst is an onium salt (paragraph 0032)

(12) wherein the cationic catalyst is selected from the group consisting of *see claim for list* (paragraph 0032);

(13) wherein the cationic catalyst is a diaryl-iodonium salt or a triaryl-sulfonium salt (paragraph 0032);

(14) wherein the cationic catalyst is a diaryl-iodonium salt having the formula *see claim for structure* (paragraph 0032); (15) wherein An^- is selected from the group consisting of *see claim for list* (paragraph 0032);

(16) wherein the cationic catalyst is a triaryl-sulfonium salt having the formulae *see claim for structure* (paragraph 0032); (17) wherein An^- is selected from the group consisting of *see claim for list* (paragraph 0032);

(18) wherein the cationic catalyst is selected from the group consisting of (4-octyloxy-phenyl)phenyl-iodonium hexafluoroantimonate, [4-(2-hydroxy-1-tetradecyloxy)phenyl]phenyl-iodonium hexafluoroantimonate, 4-(2- hydroxy -tetradecyloxyphenyl)phenyl-iodonium hexafluoroantimonate, and combinations of any two or more thereof (paragraph 0032); (19) wherein the cationic catalyst is 0.1-10 wt % of said under-fill formulation (paragraph 0032);

(22) wherein the curable resin is selected from the group consisting of epoxy resins, phenol resins, maleimide resins, itaconamide resins, nadimide resins, (meth)acrylate resins, polyamide resins, polyimide resins, cyanate ester resins, and combinations of any two or more thereof (paragraphs 0013-0024); and

(37-39) wherein said under-fill formulation is a capillary flow under-fill formulation (Abstract; paragraph 0048).

Rubinsztajn et al. fails to explicitly disclose that their method is: (1 & 28) for improving flux compatibility of an under-fill formulation in the presence of flux, flux residues and/or reaction products thereof; or (29) for improving HAST performance of an under-fill formulation

in the presence of flux, flux residues and/or reaction products thereof. However, it appears that the process/composition of Rubinsztajn et al. would have inherently accomplished these improvements because they satisfy all of the process steps and material/chemical limitations of the claimed inventions. In light of this, it has been found that, “Products of identical chemical composition can not have mutually exclusive properties.” A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that the process/composition of Rubinsztajn et al. would inherently improved flux compatibility and HAST performance of an under-fill formulation in the presence of flux, flux residues and/or reaction products thereof because they satisfy all of the process steps and material/chemical limitations of the claimed inventions.

Claim Rejections - 35 USC § 103

11. Claims 34, 36, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rubinsztajn et al. (US 2004/0101688) in view of Chan et al. (US Pat. No. 6,882,058) or Dery et al. (US Pat. No. 6,074,895).

Regarding claims 34, 36, 40, and 41, Rubinsztajn et al. disclose: (34) a method for adhesively attaching an electronic component to a circuit board (paragraph 0048), the method comprising curing a composition (paragraph 0048) comprising one or more curable resins (paragraphs 0013-0024) and one or more cationic catalyst(s) (paragraphs 0032) after application of the composition between the component and the board (paragraph 0048), wherein said

composition is a non-fluxing under-fill composition (paragraph 0048); (40) wherein said under-fill formulation is a capillary flow under-fill formulation (paragraph 0048);

(36) an article comprising an electronic component adhesively attached to a circuit board (paragraph 0048), wherein the electronic component is adhesively attached to the board by a cured aliquot of a composition (paragraph 0048) comprising one or more curable resins (paragraphs 0013-0024) and one or more cationic catalyst(s) (paragraph 0032), wherein said composition is a non-fluxing under-fill composition (paragraph 0048); and (41) wherein said under-fill formulation is a capillary flow under-fill formulation (paragraph 0048).

Rubinsztajn et al. fail to explicitly disclose: that the electronic component and circuit board are attached (34 & 36) in the presence of flux, flux residues and/or reaction products thereof. However, the presence of flux contaminants appears to be a common condition for this bonding process. The teachings Chan et al. (*see column 1, lines 45-63; column 12, line 38 through column 13, line 3*) and Dery et al. (*see column 1, lines 9-67; column 3, lines 21-34*) support this notion. Accordingly, it appears the skilled artisan would have obviously expected the presence of flux contaminants in the bonding method of Rubinsztajn et al. because the teachings of Chan et al. and Dery et al. establish that this condition is common for this type of bonding process, wherein the flux contaminants are introduced during wafer dicing.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to attach the electronic component and circuit board of Rubinsztajn et al. in the presence of flux, flux residues and/or reaction products thereof because the teachings of Chan et al. and Dery et al. establish that the presence of flux contaminants is a common condition for this type of bonding process, wherein the flux contaminants are introduced during wafer dicing.

12. Claims 11-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. (US Pat. No. 6,882,058) in view of Rubinsztajn et al. (US 2004/0101688).

Regarding claims 11-19, the teachings of Chan et al. are as set forth above and incorporated herein. Chan et al. disclose the use of a generic *cationic* catalyst; however, they fail to explicitly disclose the *onium-catalyst* limitations set forth in claims 11-19.

Rubinsztajn et al. disclose a similar under-fill formulation (*see Abstract; paragraphs 0001-0011*) featuring a cationic accelerator (*see paragraph 0032*). Their cationic accelerator:

- (11) is an onium salt (*see paragraph 0032*);
- (12) is selected from the group consisting of *see claim for list* (*see paragraph 0032*);
- (13) is a diaryl-iodonium salt or a triaryl-sulfonium salt (*see paragraph 0032*);
- (14) is a diaryl-iodonium salt having the formula *see claim for structure* (*see paragraph 0032*); (15) wherein An⁻ is selected from the group consisting of *see claim for list* (*see paragraph 0032*);
- (16) is a triaryl-sulfonium salt having the formulae *see claim for structure* (*see paragraph 0032*); (17) wherein An⁻ is selected from the group consisting of *see claim for list* (*see paragraph 0032*);
- (18) is selected from the group consisting of (4-octyloxy-phenyl)phenyl-iodonium hexafluoroantimonate, [4-(2-hydroxy-1-tetradecyloxy)phenyl]phenyl-iodonium hexafluoroantimonate, 4-(2- hydroxy -tetradecyloxyphenyl)phenyl-iodonium hexafluoroantimonate, and combinations of any two or more thereof (*see paragraph 0032*); and (19) wherein the cationic catalyst is 0.1-10 wt % of said under-fill formulation (*see paragraph 0032*).

These teachings demonstrate that the instantly claimed *onium* cationic catalysts are recognized in the art as suitable *cationic* catalysts used to cure epoxy resins in under-fill compositions. In light of this, it has been found that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination – *see MPEP 2144.07*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the instantly claimed *onium* cationic catalyst, as taught by Rubinsztajn et al., in the under-fill composition of Chan et al. because the teachings of Rubinsztajn et al. demonstrate that the instantly claimed *onium* cationic catalysts are recognized in the art as suitable *cationic* catalysts used to cure epoxy resins in under-fill compositions.

13. Claims 4 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. (US Pat. No. 6,882,058) in view of Shah (US 2004/0087681).

14. Claims 4 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rubinsztajn et al. (US 2004/0101688) in view of Shah (US 2004/0087681).

Regarding claims 4 and 23, the teachings of Chan et al. and Rubinsztajn et al. are as set forth above and incorporated herein. Both Chan et al. (*column 10, line 13 through column 11, line 48*) and Rubinsztajn et al. (*see paragraphs 0043-0045*) disclose a number of *additives* for their under-fill compositions; however, neither Chan et al. nor Rubinsztajn et al. explicitly disclose: (4) wherein the under-fill formulation further comprises core-shell rubber; and (23) wherein the core-shell rubber is selected from the group consisting of *see claim for list*.

The teachings of Shah demonstrate that the instantly claimed core-shell materials are recognized in the art as suitable *additives* for this type of under-fill formulation (*see paragraph 0017*). Specifically, they are added to improve the adhesion of the under-fill to the solder and the silicon die, improve crack resistance, and increase fracture toughness of the under-fill without damaging the temperature resistance of the under-fill. In light of this, it has been found that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination – *see MPEP 2144.07*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the instantly claimed core-shell materials, as taught by Shah, in the under-fill formulations of Chan et al. and Rubinsztajn et al. because the teachings of Shah demonstrate that the instantly claimed core-shell materials are recognized in the art as suitable additives for this type of under-fill formulation. Specifically, they are added to improve the adhesion of the under-fill to the solder and the silicon die, improve crack resistance, and increase fracture toughness of the under-fill without damaging the temperature resistance of the under-fill.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/
Primary Examiner, Art Unit 1796

December 10, 2009